SYNOPSIS FOR Ph.D. THESIS

TITLE:

"STUDIES ON EXTRAMURAL AND INTRAMURAL AEROMYCOFLORA OF DIFFERENT TEMPLES AT RAIPUR "

INTRODUCTION:

Atmosphere is made up of gaseous layer that play an important role to protects the existing all form of the life present on the earth which is persistent by the sun, soil, water, air, various flora, fauna and microorganism. Air is a fundamental medium for distribution and inoculums of various microorganisms, inhabiting mid-air surfaces. Fungal spores are predominate over the other bio -particles present in the air.

Fungi are eukaryotic, filamentous and mostly spore producing organisms, saprophyte or parasite in plants, animals and humans, which may be found in various environmental medium such as soil, plants and water. They are known to be omnipresent in nature, growing where organic materials are available. The release of fungal spores and as a result their concentration in the atmosphere causes harmful effects on various biological systems.

Climatic parameters such as wind velocity, relative humidity, temperature and precipitation, altitude and flora combination may also affect the type and quantity of fungi in the air (Asan *et al*., 2002). Aerobiology is an interdisciplinary area of Science which deals with the exploration of micro-organisms originate in the air and is directly linked with other disciplines like Mycology, Microbiology, Ecology, Meteorology, Environmental Science and Medicines etc. These airborne bio particles elated through air current and they are the main cause of human allergy.

Temples are the place which is always remains busy by the huge number of devotees gathered there not only during festival as well as non festival time. Public aggregates on temple from various regions for the purpose of worshiping. Some temples are located at highly polluted areas and thus they become prior to fungal infections. Generally devotees used coconuts, sweets, aromatic fumigating sticks (agarbatti), flowers etc. for the purpose of worshiping the lord and that things may containing various types of fungal spores which can cause various deleterious effects on temple visitors because fungal spores are the source of various plants and animals diseases.

Hence, its concentration should be investigated. The aerobiological investigations and survey of different extramural and intramural environment at some selected temples of Raipur city would provide significant and useful data that become very helpful for the controlling and management of the problem concerning with the air born mycoflora. So, this research is proposed to study on the above mentioned areas for long term of advantage for society.

A BRIEF REVIEW OF THE WORK DONE IN THE FIELD:

In India the Aerobiology work was first started by Cunningham(1873) in Calcutta Presidency jail, which he published in the form of a book entitled " Microscopic examination of air".

Tiwari *et al.* (1995) studied aeromycoflora at green house of botanical garden of Science College, Raipur. Jadhav (1996) isolated aeromycoflora over rice field at Balodabazar, Raipur. Adhikari *et al.* (1999) observed airborne fungal spores from two indoor cowsheds of suburban and rural areas of West Bengal, India. Barui and Chanda (2000) investigated aeromycoflora in the central milk dairy of Calcutta, India. Uddin (2005) isolated aeromycoflora in jute fields. Singh (2006) studied aeromycoflora in relation to leaf surface mycoflora of *Mentha arvensis*. Lall (2008) studied indoor and outdoor aeromycoflora of Dr. Bhimrao ambedkar hospital, Raipur(C.G.). Lohare and Kareppa (2009) isolated air spora over onion field at Udgir, District Latur (M.S.). Panda *et al.* (2009) studied seasonal incidence of air borne fungi in coastal belt of Orissa. Agrawal and Sharma (2010) isolated aeromycoflora of cold storage at Raipur (C.G.). Devi *et al.* (2010) conducted aeromycological investigation of store houses of onion and ginger in Guwahati. Dutta *et al.* (2010) studied air, phyllosphere and soil mycoflora of the tea plantation area of Cachar District, Assam. Sharma (2010) studied seasonal variation of aeromycoflora over *Ocimum sanctum* plant with special reference to winter season. Sharma (2011) studied aeromycoflora in relation to soil mycoflora of Dargiling tea garden, India. Baruah and Sarma (2012) studied occurrence of aeromycoflora in the fruit markets of Golpara District, Assam. Chavan (2012) studied occurrence of ascomycetes fungal spores over paddy fields at Raigad in Konkan region.(*Oryza sativa* L.*)*. Khan and Karuppayil (2012) studied fungal pollution of indoor environments and its management. Kiranmai Reddy and Srinivas (2012) studied air microflora in selected areas of Visakhapatnam. Patel (2012) studied indoor air quality of onion store house at Nasik, India. Tiwari and Saluja (2012) studied ecological of over *Catharanthus roseus* L.

NOTEWORTHY CONTRIBUTION IN THE FIELD OF PROPOSED WORK:

Noteworthy contribution in the field was made by following scientist and workers.

Singh *et al*. (1994) studied airborne fungi in the hospitals of metropolitan Delhi. Tiwari (1999) conducted aerobiological survey of Raipur with special reference to fungal spores. Arya *et al.* (2001) studied indoor aeromycoflora of Baroda museum and deterioration of Egyptian mummy. Ghosh *et al.* (2011) observed aeromycoflora in the indoor environment of Shyambazar metro-railway station, Kolkata, India. Kulkarni (2011) studied aeromycological profile of the public parks of Bhilai township, Chhattisgarh, India. Lanjewar (2011) studied the estimation of moulds

air pollution in Tilda, Raipur. Sharma (2011) studied concentration and species diversity of airborne fungi of Donagargarh. Sharma *et al.* (2011) studied incidence of air borne fungal spores in the air of hill top. Shukla and Shukla (2011) studied air borne fungal spores in the atmosphere of industrial town Korba - Chhattisgarh, India. Ahire *et al.* (2012) studied aeromycoflora of the government general hospital at Nasik. Bhattacharjee *et al.* (2012) investigated aeromycology in a bus terminus in Guwahati city, Asam. Chelak and Sharma (2012) investigated aeromycoflora of Chandragiri hill top, Chhattisgarh. Gaikwad and Sonawane (2012) studied fungi as bio-indicators of air quality at Nasik. Kalbende *et al.* (2012) studied the monitoring of airborne mycoflora in the indoor air quality of library. Lall and Jadhav (2012) studied aeromycoflora in an outdoor environment of Dr. Bhimrao Ambedkar hospital, Raipur (C.G.). Tiwari (2012) studied airspora in two cities. Thirumala and Nathu (2013) studied fungal spores diversity, in Malebenur region of Karnataka, India.

OBJECTIVES:

Raipur is the capital of Chhattisgarh. The population of this capital is about 30, 16,930. Raipur is the east part of Central India. It is situated 21º14 North latitude and 81º38 east longitudes, on the bank of Kharun River which is 298 meters above the sea level. The Geographical area of Raipur is about 12,445 Sq. Km. This city has various temples which plays very important role to connect the people belonging to various communities and religions to the spiritual world of almighty. This research is proposed for the aerobiological investigations and survey of various extramural and intramural environment within some selected temples of Raipur city. Following objectives are proposed for the present study:

1. Survey and identification of extramural and intramural aeromycoflora at monthly interval.
2. To investigate the seasonal variations of aeromycoflora.
3. To determine the percentage frequency and percentage abundance of aeromycoflora.

PROPOSED METHODOLOGY DURING THE TENURE OF RESEARCH WORK:

Study area:

For present research purpose we have selected three different temples that are situated in Raipur

and are very famous for their religious and cultural value are as follows-

Doodhadhari Matha: It is 1610 BC old temple dedicated to Lord Rama and Goddess Sita and thus it is commonly called as RamJanki temple. It has about 3 acres area. In Raipur it is situated at Mathapara infront of Mathapuraina pond under Ravanbhatha region.

Banjari Temple: It is 55 year old temple and is dedicated to Goddess Banjari Mata one of the Shaktipeeth among all the Devishakti. It covers the area about more than 0.75 acres. It is located on the campus of PT. Ravishankar Shukla University, Raipur which follows by the road on the left side of the University playground. This temple is very famous because a huge crowd gathered the time of Shardiya and Chaitra Navaratri.

Jagannath Temple: This temple is dedicated to Lord Jagannath which is very important for the famous Rathayatra celebrating every year. This temple is established on the year of 1997. It covers the area about 1.25 acres. It is situated at Gayatri Nagar come under Avantibihar near about Shankar Nagar, Raipur.

Methodology:

1. Gravity petri plate method: Gravity petri plate method is use for the survey and identification of extramural and intramural aeromycoflora (Jadhav and Tiwari, 1994).

Sampling: The sampling will be carried out for two years.

During aeromycoflora survey of some selected temples of Raipur city 10 - sterilized petri plates containing PDA (Potato Dextrose Agar) media will be expose for 5-10 minutes into each sampling sites at monthly interval (Devi *et al*., 2010 and Kalbende *et al.,* 2012).

Five petri plates will be expose indoor environment of the temples and five petri plates will be expose to outdoor environment of the temples.

There after exposed petri plates will be bring into laboratory and the petri plates will be incubate at room temperature for incubation period.

After that incubation period fungal colonies will be count, isolate and identify with the help of available literature and maintain the pure culture and finally identification will be done by the authentic authority.

2. Ecological studies: Percentage frequency and percentage abundance of the aeromycoflora of extramural and intramural environment will be calculate with the help of the following formula (Jadhav and Tiwari, 1994)

$$\text{Percentage Frequency} = \frac{\text{No. of the observation in which a species appeared}}{\text{Total no. of observations}} \times 100$$

$$\text{Percentage Abundance} = \frac{\text{Total no. of colonies of a species in all the observation taken together}}{\text{Total no. of colonies in all species}} \times 100$$

EXPECTED OUTCOME OF THE PROPOSED WORK:

1. This study would provide essential information of long-term airborne fungal spore composition and variation at some select temples situated in Raipur city.
2. The fungal spore calendar constructed by our study will be helpful in predicting the concentration of almost all the available air spores in the sampling area, as well as the intensity of individual spore in different months of the year found in the situated area. So this research will be useful for the people.
3. Proposed work will be beneficial for human health as well as we can know about fungal diversity who related with plants, animals and humans.
4. The outcome of this research work will be give better knowledge for specific group of fungi.
5. The research may become useful for the scientists working in the field of aerobiology.

BIBLIOGRAPHY:

Adhikari, A., Sen, M.M., Battacharya, S.G. and Chanda, S. (1999): Studies on airborne fungal spores from two indoor cowsheds of suburban and rural areas of West Bengal, India. Abst. *Indoor and Built Environment*, **8(4):** 221-229.

Agrawal, M. and Sharma, K. (2010): Isolation of aeromycoflora of cold storage at Raipur (C.G.). *Inter. Research J*., **1(6):** 1-3.

Ahire, P.P., Shinde, H.P., Goswami, D.B. and Kadam, V.B. (2012): The study of aeromycoflora of the government general hospital at Nasik. *Research Article, V. B. Kadam, IJPRBS*., **1(4):** 264 -267.

Arya, A., Shah, A.R. and Sadasivan, S. (2001): Indoor aeromycoflora of Baroda museum and deterioration of Egyptian mummy. *Curr. Sci.,* **81(7):** 793-799.

Asan, A., Sav, B. and Sarica, S. (2002): Airborne fungi in urban air of Edime city (Turkey). *Biologia*. **57:** 59-68.

Barui, N.C. and Chanda, S. (2000): Aeromycoflora in the central milk dairy of Calcutta, India. *Aerobiol.,* **16:** 367-372.

Baruah, P.S. and Sarma, T.C. (2012): Occurrence of aeromycoflora in the fruit markets of Golpara District, Assam. *An Inter. Quart. J. of Environ. Sci.,* **(1):** 299-302.

Bhattacharjee, K., Sarma, G.C. and Kalita, S. (2012): Aeromycology study in a bus terminus in Guwahati city, Asam. *Asian J. Exp. Biol. Sci*., **3(2):** 311-319.

Chavan, V.S. (2012): Occurrence of ascomycetes fungal spores over paddy fields at Raigad in Konkan region.(*Oryza sativa* L.*). Ind. Streams Research J*., **1(5):** 1-4.

Chelak, E.P. and Sharma, K. (2012): Aeromycological study of Chandragiri hill top, Chhattisgarh. *Inter. Multidiscipl. Research J.,* **2(11):**15-16.

Cunningham, D.D. (1873): Microscopic examination of air. Govt. Printer Calcutta , 58.

Devi, J., Medhi, S. and Sarma, T.C. (2010): Aeromycological study of store houses of onion and ginger in Guwahati. *J. of Life Sci*., **(2):** 547-552.

Dutta, S., Dutta, B.K. and Nath, P.K. (2010): Comparative study of the air, phyllosphere and soil mycoflora of the tea plantation area of Cachar District, Assam. *Assam Univ. J. of Sci. & Technol*. : *Biolog. and Environ. Sci*., **5(1):** 89-94.

Gaikwad, K.N. and Sonawane, M.D. (2012): Fungi as bio-indicators of air quality at Nasik. *Inter. J. of Life Sci. and Pharma Reseach*, **2(3):** 25-28.

Ghosh, D., Dhar, P., Das, A.K. and Uddin, N. (2011): Identifcation and distribution of aeromycoflora in the indoor environment of Shyambazar Metro-Railway Station, Kolkata, India. *African J. of Microbio. Research*, **5(31):** 5569-5574.

Jadhav, S.K. and Tiwari, K.L. (1994): Aeromycoflora of Ravan village. *Ind. Bot. Report.,* **1(1&2):** 33-36.

Jadhav, S.K. (1996): Studies of aeromycoflora over rice field at Balodabazar Raipur, Ph.D. Thesis, PT. R.S.U. Raipur (C.G.).

Kalbende, S., Dalal, L. and Bhowal, M. (2012): The monitoring of airborne mycoflora in the indoor air quality of library. Scholars Research Library, *J. Nat. Prod. Plant Resour.,* **2(6):** 675-679.

Khan, A.A.H. and Karuppayil, S.M. (2012): Fungal pollution of indoor environments and its management. *Saudi. J. of Biolog. Sci*., 1**9(4):** 405- 426.

Kiranmai Reddy, M. and Srinivas, T. (2012): A study of air microflora in selected areas of Visakhapatnam. *Int. J. Curr. Sci.,* 63-67.

Kulkarni, P. (2011): Aeromycological profile of the public parks of Bhilai Township, Chhattisgarh, India. *Ind. J. of Sci. and Technol.,* **4(5):** 558-560.

Lall, B.M. (2008): Studies of indoor and outdoor aeromycoflora of Dr. Bhimrao ambedkar hospital, Raipur (C.G.). Ph.D. Thesis, PT. R.S.U. Raipur (C.G.).

Lall, B.M. and Jadhav, S.K. (2012): Studies of aeromycoflora in an outdoor environment of Dr. Bhim rao Ambedkar hospital, Raipur (C.G.). Abst. *J. of Experimen. Sci.,* **3(6):** 73.

Lanjewar, S. (2011): The estimation of moulds air pollution in Tilda, Raipur. *J. of Phytol.,* **3(4):** 09-10.

Lohare, S.D. and Kareppa, B.M. (2009): Air spora over onion field. *Inter. Resear. J.,* **1(3 &4):** 116-117.

Panda, T., Panda, B. and Mishra, N. (2009): Seasonal incidence of air borne fungi in coastal belt of Orissa. *J. Hum. Ecol*., **26(3):** 205-207.

Patel, S.I. (2012): Studies on indoor air quality of onion store house at Nasik, India. *Inter. Referred Research J*., **3(29):** 38-40.

Sharma, K. (2011): Concentration and species diversity of airborne fungi of Donagargarh. *Inter. Multidisci. Resea. J*., **1(9):** 34-36.

Sharma, K. (2011): Comparative study of aeromycoflora in relation to soil mycoflora of Dargiling tea garden, India. *Recent Research in Sci. and Technol*., **3(5):** 84-86.

Shukla, S. and Shukla, R.V. (2011): Air borne fungal spores in the atmosphere of industrial town Korba- Chhattisgarh, India. *Microbiol. J*., **1:** 33-39.

Singh, A., Gangal, S.V. and Singh, A.B. (1994): Airborne fungi in the hospital of metropolitan, Delhi. *Aerobiol.,* **10(1):** 11-21.

Singh, N.B. (2006): Studies of aeromycoflora in relation to leaf surface mycoflora of *Mentha arvensis* Ph.D. Thesis, PT. R.S.U. Raipur (C.G.).

Thirumala, S. and Nathu, M.P. (2013): Study of fungal spores diversity, in Malebenur region of Karnataka, India. *Int. J. Curr. Microbiol. App. Sci.*, **2(3):** 44-48.

Tiwari, K.L., Sahu, K. and Jadhav, S.K. (1995): Aeromycoflora at green house of Botanical garden of Science College. *Ad. Plant Sci.*, **18(1):** 46-51.

Tiwari, P. (1999): Aerobiological studies of Raipur with special reference to fungal spores. Ph.D. Thesis, PT. R.S.U. Raipur (C.G.).

Tiwari, K.L. and Saluja, P.K. (2012): Ecological studies of aeromycoflora over *Catharanthus roseus* L. *Ind. J. Applied & Pure Bio.*, **27(1):** 59-64.

Tiwari, P. (2012): Comparative study of airspora in two cities. *J. Ecobiotechnol.*, **4(2):** 247-249.

Uddin, N. (2005): Estimation of aeromycoflora in jute fields. *Aerobiol.*, **21:** 75–80.

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